EXHIBIT 21

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IN REPLY REFER TO:

June 19, 2008

Thomas Sinks, Ph.D.
Deputy Director
National Center for Environmental
Health/Agency for Toxic Substances and
Disease Registry
1600 Clifton Road, Mail Stop E-28
Atlanta, Georgia 30333

Dear Dr. Sinks,

I am writing this letter to you to reiterate our continued support for working with the Agency for Toxic Substances and Disease Registry (ATSDR) to complete the in-progress groundwater modeling effort that addresses health concerns from past drinking water contamination at U. S. Marine Corps Base in Camp Lejeune, North Carolina. The best way to do this is to support the most scientifically and technologically sound study methods available in order to get answers that are meaningful and scientifically valid.

In March 2008, ATSDR presented its Tarawa Terrace water modeling efforts in a summary report entitled "Exposure to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancer at U.S. Marine Corps Base Camp Lejeune, North Carolina". Ideally, we would have specific, water sample results that could be used to determine potential exposure levels. Unfortunately this information does not exist. Because it doesn't, ATSDR undertook this water modeling effort as a means to approximate the historical results over a 35 year time frame. As with all modeling efforts, there is a great deal of uncertainty in trying to re-create the past. ATSDR has gone to great efforts to test and validate the model, and the resulting estimated results, using the limited available data. Attached are some specific concerns and recommendations related to this matter. We look forward to discussing them with you at our next meeting.

We are committed to working with you to improve the scoping of work efforts, researching and reviewing technical information, and achieving consensus of these critical efforts. We have a common responsibility to ensure the technical and scientific information is effectively communicated to our Marines, Sailors and families, and the public. It is imperative to carefully and accurately characterize and communicate results of the water modeling studies so the results will be understood within the context of the study's limitations and uncertainties.

My point of contact to coordinate discussion of these issues is Ms. Kim Brown, who can be reached at (202) 685-0096 or kim.brown@navy.mil.

Thank you for your attention to this matter.

B. P. HARRISON, M.P.A., P.E.
by direction

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Assessment of
ATSDR Water Modeling for Tarawa Terrace

The purpose of this assessment is (1) to document the Navy/Marine Corps' current understanding of the ATSDR water modeling for Tarawa Terrace and (2) to serve as a basis for additional technical discussions between the Navy/Marine Corps and ATSDR.

Background

During a Technical Information Meeting with the Marine Corps and Navy on March 26, 2008, the ATSDR presented their water modeling efforts in a summary report entitled "Exposure to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancer at U.S. Marine Corps Base Camp Lejeune, North Carolina," (March 26, 2008). The report indicates that the following specific information is needed in order to conduct a health study on these birth defects:

1. When did contaminated groundwater reach water supply wells? **month and year**
2. What was the timing, level, and duration of maternal or infant exposure to contaminated drinking water:
    a. In which **months** did exposure occur?
    b. What was the **monthly** average level of contamination?
    c. For how many **months** did exposure occur?

Thus, extensive data are required in order to conduct the proposed health study. Since no measured concentrations of PCE (perchloroethylene) are available prior to 1982, the ATSDR has used modeling to simulate these concentrations at Tarawa Terrace, and proposes a similar modeling approach for Hadnot Point. The results of the Tarawa Terrace modeling are being documented in the ATSDR modeling report entitled "Analysis of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions" (ongoing, but initial chapters published in 2007 and 2008).

In general, the usefulness of a groundwater flow and contaminant transport model depends on an accurate estimate of numerous model parameters that describe site geology, groundwater velocity, well pumping rates, and contaminant properties. Many of these parameters are highly variable and difficult to estimate directly. Therefore, model calibration and validation are essential steps in the modeling process. Model calibration involves adjusting the initial parameter values until simulated model concentrations match measured concentrations. In a second step, the calibrated model is validated by comparing simulated concentrations to additional measured concentrations that were not used during calibration. During validation, the model is "put at risk," and it may be judged unsuccessful if the simulated and measured concentrations do not match.

Tarawa Terrace Water Modeling

The Tarawa Terrace housing development at Camp Lejeune was constructed in 1951, and the Tarawa Terrace Water Treatment Plant (WTP) began to distribute drinking water during 1952-1953. The only documented source of contamination at Tarawa Terrace is ABC One-Hour

Cleaners, which began operations during 1953, using the chlorinated solvent PCE in its dry cleaning process. PCE concentrations were measured at the WTP in 1982 and 1985, and no measured concentrations of PCE are available prior to 1982.

Monthly PCE concentrations are required for the ATSDR health study, which will examine births that occurred from 1968 (when North Carolina computerized its birth certificates) to 1985 (when the contaminated water supply wells were removed from service). Due to lack of measured concentrations, the ATSDR used groundwater flow and contaminant transport modeling in a historical reconstruction process to simulate PCE concentrations in the drinking water on a monthly basis from 1952 to 1987.

Figure 1 shows the simulated concentrations of PCE versus measured concentrations in finished water from the WTP. Significantly, measured concentrations of PCE are available only in 1982 and 1985, near the end of the overall time period. Thus, the majority of the simulated concentrations cannot be compared to measured data. Furthermore, all of the measured concentrations were used during model calibration, leaving no data available for model validation. As a result, the Tarawa Terrace model was not validated.

During calibration, model parameters were adjusted to cause the simulated concentrations at the Water Treatment Plant (WTP) to meet the calibration standard to the degree possible. For PCE detections, the ATSDR chose the calibration standard to be "± 1/2-order of magnitude of the observed valued," such that the higher value in the calibration target range is 10 times greater than the lower value. For example, at the WTP in May 1982, the calibration target range was 25 to 253 ug/L, based on the measured PCE concentration of 80 ug/L. The simulated concentration of 148 ug/L fell within this range. As another example, at supply well TT-26 in January 1985, the calibration target range was 500 to 5,000 ug/L based on the measured PCE concentration of 1,580 ug/L. In this case, the range was quite large because it was calculated from a relatively high measured concentration. The simulated concentration of 804 fell within the range, near the lower end. In summary, based on the chosen calibration standard, the calibration process was viewed as "successful" over a range that spanned a factor of 10. In other words, a model-derived PCE concentration can be approximately 3 times higher or 3 times lower than the measured concentration and still fall within the calibration range.

Thus, if all comparisons had fallen within the calibration range, the chosen calibration standard would give an idea of the accuracy, or degree of fit, between simulated and measured concentrations. However, all comparisons did not fall within the calibration range. At the WTP, 12% of the simulated PCE concentrations failed the calibration standard (p. F42 in the ATSDR modeling report). It should be noted that these failures involved non-detects or very low concentrations. More significantly, at the water supply wells, a majority (53%) of the simulated concentrations fell outside the calibration standard (p. F33 in the ATSDR modeling report). Graphs of simulated versus observed concentrations of PCE in water supply wells RW2, TT-23, TT-25, TT-26, and TT-54 are shown below in Figures F13 through F17 (p. F34 and F35 of the ATSDR modeling report). The graphs show that only a few observed PCE concentrations are available, and there are substantial differences between observed and simulated concentrations. Model performance at the supply wells raises concerns about the degree to which the model calibration was successful. It seems reasonable to conclude that the accuracy of historically

reconstructed PCE concentrations would be less than the calibration standard of ± 1/2-order of magnitude. Thus, the historical reconstructions may be viewed as rough estimates of actual exposure concentrations, with model-derived PCE concentrations representing a relatively wide range of possible exposures. It is essential that this concept be expressed clearly and consistently to all stakeholders.

For example, the public needs to understand that the model-derived PCE concentrations represent a range of possible exposures. This concept should be expressed more clearly on the Camp Lejeune website (http://www.atsdr.cdc.gov/sites/lejeune/watermodeling.html). Currently the website has a section that says: "Find Out PCE Levels During Your Tour; Find out the levels of PCE and PCE degradation by-products in the drinking water serving your home in Tarawa Terrace by entering the dates you lived in Tarawa Terrace housing from 1952 to 1987." Following a disclaimer, a search engine produces contaminant concentrations, reported to 4 significant digits, for any or all months between January 1952 and February 1987. With no error bars or ranges included, this webpage conveys a sense of certainty that is not justified. The usefulness of the website would be enhanced if it accurately conveyed the degree of uncertainty in the model-derived concentrations.

Other concerns with model calibration include the simulation of contaminant mass loading and groundwater flow. With Dense, Non-Aqueous Phase Liquids (DNAPLs) such as PCE, mass estimation is always quite difficult and subject to very high uncertainty due to irregular movement and distribution of DNAPL in the subsurface. For Tarawa Terrace groundwater, the difference between observed and simulated elevations is 5 to 10 feet at many times during the 1970's and 1980's. This is a significant disparity because the total change in groundwater elevation from the source area to the receptor wells is approximately 10 to 12 feet. In addition, model results suggest that the simulated PCE concentrations at the WTP depend significantly on the pumping rates at the various water supply wells. The degree to which simulated well operations match actual operations is a concern. The Navy/Marine Corps would welcome the opportunity for further technical discussion with ATSDR on these issues.

The ATSDR performed a sensitivity analysis to determine the relative importance of individual model parameters. In addition, a probabilistic analysis was performed to assess variability and uncertainty associated with the model results. Both approaches are standard practice. Chapter A of the ATSDR modeling report describes the probabilistic analysis, during which input parameters such as hydraulic conductivity, recharge, and dispersivity were chosen from distributions of possible values. The model was run 840 times to produce "realizations" that form a distribution of simulated PCE concentrations, rather than a single result (pp. A52 – A61 of the ATSDR modeling report). However, certain combinations of input parameters resulted in wells drying out, so only 510 physically viable realizations were produced. Thus, 330 out of 840 realizations were not viable, raising concerns about the representativeness of the input parameter distributions. Although a summary of the probabilistic analysis is presented in Chapter A of the ATSDR modeling report, the details will be in Chapter I, which is not yet available. The Navy/Marine Corps feels that additional information on this matter would likely help our understanding.

Overall, it is important to keep in mind that both the sensitivity analysis and the probabilistic analysis were performed entirely within the "model world," not the "real world." These methods provide valuable insight into the behavior of the model, but they are not a substitute for real, measured PCE concentrations. Again, the Navy/Marine Corps looks forward to additional discussion and clarification of our understanding of these issues.

Summary

The usefulness and applicability of the model-derived PCE concentrations for Tarawa Terrace are affected by the following:

1. Model simulations provide monthly concentrations from 1952 to 1987, but measured concentrations for model calibration are available only in 1982 and 1985. Thus, the majority of the simulated concentrations cannot be compared to measured data.
2. Simulated concentrations did not fall within calibration targets for a majority of the measured PCE concentrations at the water supply wells, suggesting that the "accuracy" of the model is less than the chosen calibration standard of ± 1/2-order of magnitude.
3. Due to lack of measured PCE concentrations, the Tarawa Terrace model was not validated. Therefore, the model was not "put at risk," and it is difficult to judge the accuracy of the simulated PCE concentrations beyond the limited times when calibration data are available.

Groundwater modeling studies are always subject to a high degree of uncertainty, and in this sense, the Tarawa Terrace water model is no exception. However, the goal of the Tarawa Terrace model is to reconstruct PCE concentrations on a monthly basis over approximately 30 years in order to conduct a health study. This is an extremely difficult goal since measured PCE concentrations are not available prior to 1982, and the historical reconstruction of monthly exposure concentrations must go back to the 1950's. Any use of reconstructed concentrations must take into account the inherent uncertainty in the model results.

Recommendations

As a starting point for further discussions, the Navy/Marine Corps proposes the following recommendations:

1. Improve communication with the public and other stakeholders by developing a method for presenting the uncertainty in the model-derived PCE concentrations. The method should be clear and readily understood, perhaps using error bars or presenting a concentration range rather than a single number. The method should be applied consistently whenever concentrations are discussed or presented in model reports, websites, public meetings, etc.
2. Convene an expert panel to examine the model results and determine the best use for the data. Overall, the panel should develop a path forward that is scientifically sound and will best meet the critical concerns of the public.
3. Finalize the remaining sections of the Tarawa Terrace water modeling report.
4. Apply all lessons learned from the Tarawa Terrace modeling efforts to the scoping of the approach for Hadnot Point.

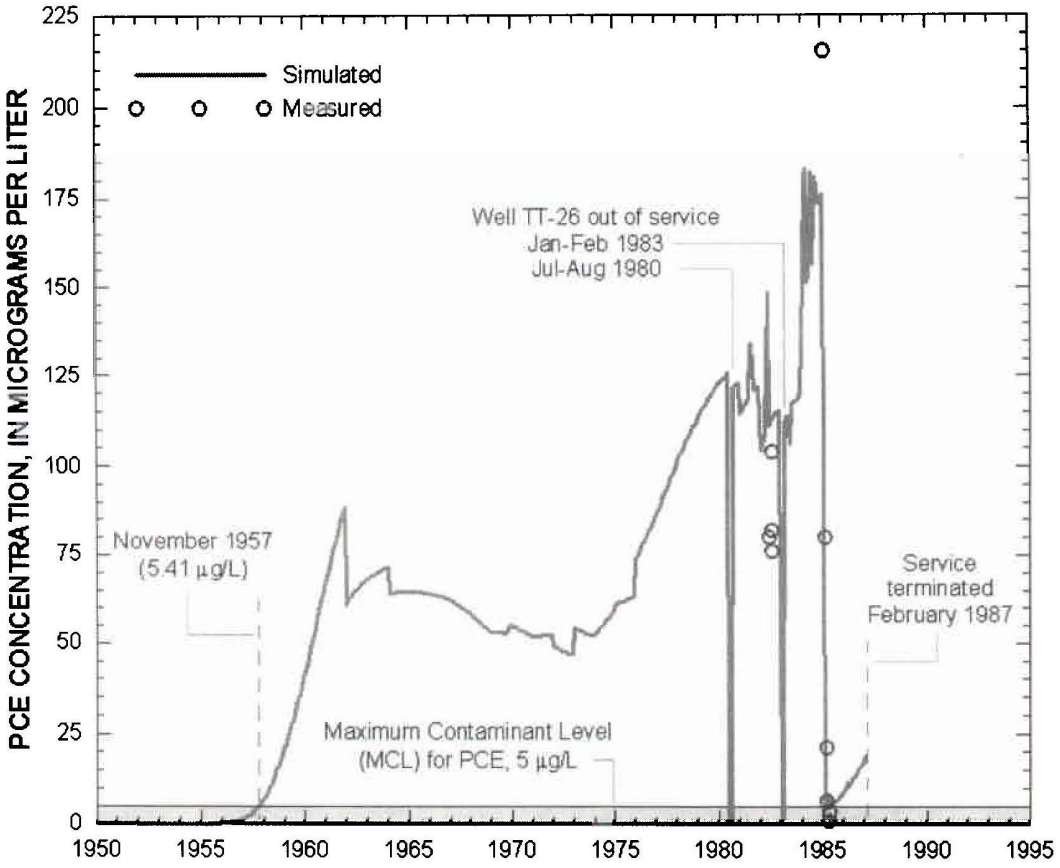

Figure 1. Simulated and measured concentration of tetrachloroethylene (PCE) in finished water at the Tarawa Terrace water treatment plant (from Tarawa Terrace Chapter A report).

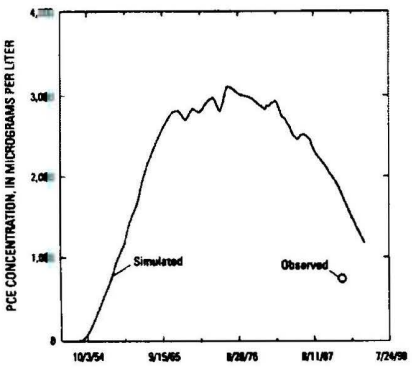

Figure F13. Simulated and observed tetrachloroethylene (PCE) concentrations at local water-supply well RW2, near ABC One-Hour Cleaners, Jacksonville, North Carolina, January 1951–December 1994 (see Figure F6 for location).

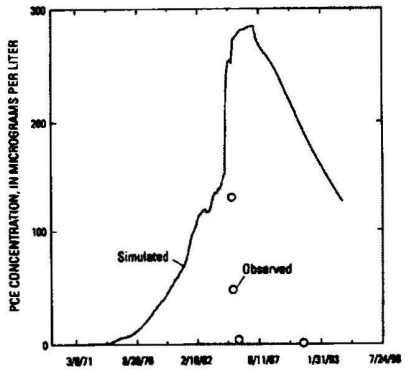

Figure F14. Simulated and observed tetrachloroethylene (PCE) concentrations at water-supply well TT-23, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina, January 1969–December 1994 (see Figure F6 for location).

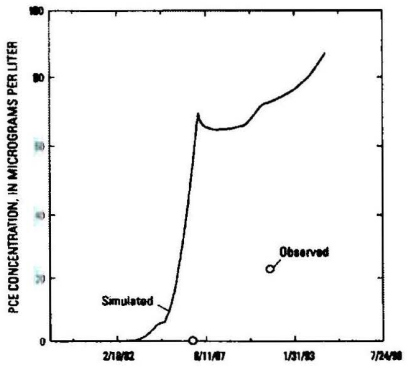

Figure F15. Simulated and observed tetrachloroethylene (PCE) concentrations at water-supply well TT-25, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina, January 1978–December 1994 (see Figure F6 for location).

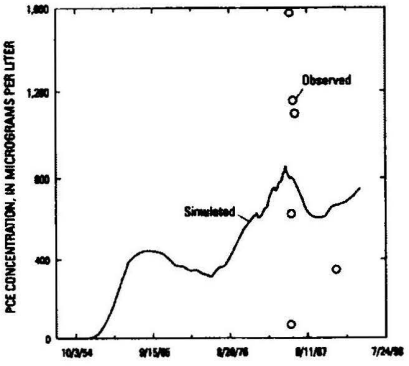

Figure F16. Simulated and observed tetrachloroethylene (PCE) concentrations at water-supply well TT-26, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina, January 1952–December 1994 (see Figure F6 for location).

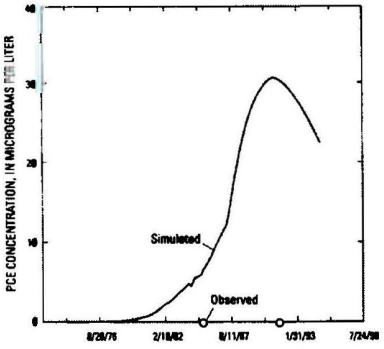

Figure F17. Simulated and observed tetrachloroethylene (PCE) concentrations at water-supply well TT-54, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina, January 1970–December 1994 (see Figure F6 for location).